U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Defense Production Act Phase II Awards
Biomass R&D
Technical Advisory Committee

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DPA Initiative Goals

- In June 2011, Secretaries of Agriculture, Energy, and Navy signed MOU to commit $510M (up to $170M from each agency) to produce hydrocarbon jet and diesel biofuels in the near-term. This initiative sought to achieve:
  - Multiple, commercial scale integrated biorefineries
  - Cost-competitive biofuel with conventional petroleum (w/o subsidies)
  - Domestically produced fuels from non-food feedstocks
  - Drop-in, fully compatible, MILSPEC fuels (F-76, JP-5, JP-8)

- DoD uses approximately 5 billion gallons of fuel annually and represents a key market adopter for advanced biofuels technologies

- Navy has begun to issue solicitations via Defense Logistics Agency to purchase biofuels blends through their regular procurement contracts as long as they meet cost and performance criteria

DPA Initiative – Accomplishments/Milestones

- In May 2013, four projects were selected for Phase I awards with $30M from DoD funds - Phase I was an 18 month effort to accomplish front end engineering design, site selection, and permitting tasks

- Successful projects have been selected to go on to Phase II (construction, equipment purchases, and commissioning) if funds are available. A down-select from four projects was announced depending on availability of funds or the ability to partially fund projects:

  - **Emerald Biofuels** - hydro-treating and upgrading of fats, oils and greases
  - **Fulcrum Brighton Biofuels –** municipal solid waste gasification followed by Fischer-Tropsch conversion to jet fuel
  - **Red Rocks Biofuels, LLC –** forest biomass and wood wastes gasification followed by Fischer-Tropsch conversion to diesel and jet

Down-Select for Phase 2

Project	Location	Feedstock	Capacity (million gallons/year)
Fulcrum	McCarran, NV	Municipal solid waste	10
Emerald	Gulf Coast	Fats, oils, and greases	82
Red Rock	Lakeview, OR	Woody biomass	12

- Production anticipated to begin in 2016/2017.
- These fuels have been approved for use as jet fuel by ASTM at up to 50/50 blends.
- Fuels successfully demonstrated during Rim of the Pacific (RIMPAC) demonstration in 2012 for ships and planes.
- Fuels can be utilized in Navy's warfighting platforms with no degradation to performance or mission.

Additional Supporting Activities

- As fuels become available Navy will make advanced drop-in biofuels a regular part of its bulk fuel procurement.

- USDA has awarded Fulcrum a $105 million Biorefinery Assistance Program loan guarantee through Bank of America for construction of their facility. The total project cost is $266 million. 147,000 tons/year of MSW will be gasified to synthesis gas followed by Fischer-Tropsch conversion to jet fuel.

- Cathay Pacific Airways has become an investor in Fulcrum and has negotiated a 10 year supply agreement for jet fuel.

- Southwest Airlines has signed a fuel purchase agreement with Red Rock for 3 million gallons/year of jet fuel. Blended product will be used at Southwest's Bay Area operations. 140,000 dry tons/year of woody biomass feedstock will be converted into renewable jet, diesel, and naphtha.

Relevance of DPA to DOE - Commercialization Pipeline

- DOE involvement is essential in both the DPA and internal demonstration and deployment activities
- DPA strength is commercialization (each facility producing 10 million gallons/year or more, capital cost $200 - $600 million each, selling fuels to the market) – requires leveraging of funds among multiple agencies due to cost
- DOE strength is pilot and demonstration of innovative technologies (facilities producing fuels in batch or campaign mode, capital cost $25 - $150 million each, using fuels for testing/certification purposes)
- DOE investment in demonstration and deployment activities places conversion technologies at the beginning of the pipeline that subsequently becomes eligible for DPA funding